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Authorship Trends Over the Past 30-Years in the *Annals of Biomedical Engineering*

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Abstract

In academia, manuscripts serve as an important component of career development. The past several years have seen heightened evaluation of the role of the gender gap in career advancement, as well as other bibliometric changes in publications. We therefore analyzed authorship and publication trends in the *Annals of Biomedical Engineering* over the past three decades (one complete year of manuscripts for each decade; 1986, 1996, 2006, and 2016). The variables analyzed were number of authors per manuscript, numerical position of the corresponding author, number of collaborating institutions and countries, number of references, and number of citations per manuscript. The gender of both the first and corresponding authors was identified and analyzed over time and by region. Globally, the percentage of female first and corresponding authors significantly increased from 0% in 1986 to 28.6% ($p = 0.003$) and 20.4% ($p = 0.0009$) respectively, in 2016. Although there were significant differences regarding female first and corresponding author over time, they did not vary by region of origin (p = 0.5 and 0.2, respectively). Overall, these findings highlight the improvements made and the challenges that still exist related to publishing within the bioengineering field.

Keywords

Gender; Female; Author; Bibliometric analysis; Publication trends

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3. INTRODUCTION

Gender gaps still exist between men and women even though women comprise 49.6% of the world's population.[47] The disparities are often greatest in male-dominated fields such as certain sciences and engineering.[4, 28, 44] Over the past 30 years, gender gaps have slowly been closing. Currently, 14.6% of CEO positions and 8.1% of top earning positions are held by women.[23] In 2015, 19.9% of bachelor's degrees (B.S.) in engineering were awarded to women.[50] The total percentage of women pursuing master's (M.S.) and doctoral (Ph.D.) degrees in engineering were 24.1% and 26.2%, respectively.[50] Additionally, in 2015, 15.7% of academic faculty positions were occupied by women, a 4% increase from 2006.[50] Of interest, female engineering faculty who started as assistant professors left the profession at higher rates than did men, particularly between the third and seventh year from their start date. This discrepancy has not been observed in other disciplines such as agricultural, biological, mathematical, and biomedical sciences.[25]

In 2015 in biomedical engineering (BME), women received 40.9% of the B.S. degrees as compared to 13.2% and 12.5% in mechanical and electrical engineering, respectively.[26] Women in BME have also received more M.S. and Ph.D. degrees than in traditional engineering areas.[26]

In the academic community, publication in peer-reviewed journals is the primary means for researchers to communicate their contributions, and publications are also required for academic career advancement. Authorship has been defined as a currency within academia overall, within the engineering field, and BME specifically.[6, 7, 28, 34] Studying authorship trends provides valuable information on the prevalence of current and future directions in the field studied. The *Annals of Biomedical Engineering (ABME®)* is "…an interdisciplinary, international journal which presents original and reviewed articles in the major fields of bioengineering and biomedical engineering".[15] It focuses on research providing integrated approaches to the solutions of biological and biomedical problems. The purpose of this study was to analyze authorship trends, including gender, in the *ABME®* over the past 30 years.

4. MATERIALS AND METHODS

Data Collection Process

The analyses were performed on manuscripts published over a 30-year period. Data were collected from manuscripts published in ten-year intervals from 1986 to 2016. This periodic sampling technique has been previously described and validated.[49] The most recent year with a complete set of publications was 2016 as the study commenced in 2017. The gender of both the first author(s) and the corresponding author(s) was documented. A "Baby Name Guesser" website (http://www.gpeters.com/names/babynames.php) was used to identify the gender of both the first and corresponding authors. Briefly, the first name is entered, and the website provides the most likely gender and a gender ratio. A ratio of 3.0 or higher was considered a "correct" identification of gender. If the ratio was less than 3.0, then the author's gender was confirmed via a Google™ search. If the search did not result in confirming the author's gender, then the entry was excluded for gender analyses.

To examine and organize the publication data, EndNote X7™ (Clarivate Analytics, Philadelphia, PA) was used. The EndNote™ data was organized by exporting it into a Microsoft Excel™ 2013 (Microsoft, Redmond, WA) file. Manuscripts with no author were excluded as well as editorials, letters, commentaries, memorandums, meeting notes, abstracts, and all publications that were available electronically prior to editorial typesetting etc. (e.g. e-pub ahead of print) for that specific year but not published until the following year. The countries in which the corresponding authors resided were recorded and the state or province for those in the United States or Canada, respectively, were also recorded. The numerical position of the corresponding author (e.g. 1, 2, and 3…last author), number of references, and publication length (total printed page number) was recorded. The number of times each publication had been cited was obtained via a Scopus search of each specific publication. All Scopus searches were completed in December of 2017.

Assignment of Geographic Region

Canada and the United States of America were designated as North America. Mexico, Central America, and South America were grouped as Latin America. Europe was classified as all European countries including Turkey and Russia. Asia included all Asian countries east of Turkey as well as Middle Eastern countries, including Israel. The other regions were Africa and Oceania (Australia and New Zealand).

Biomedical Engineering Society (BMES) Presidents and ABME® Editorial Board Members

As the *ABME*® is a publication of the BMES, we collected data for the gender and region of BMES presidents over time. Additionally, gender and region of *ABME*® Editorial Board members (Editors, Associate Editors, and Editorial Board) for the same years was gathered, allowing us to compare gender and regional trends between the authors and the Editorial Board.

Statistical Analyses

Continuous data are reported as the mean ± 1 standard deviation. Discrete data are reported as frequencies and percentages. Non-parametric tests were used for analyses between groups of continuous data due to non-normal distributions (Mann-Whitney U– 2 groups; Kruskal-Wallis test – 3 or more groups). The Fisher's exact test (2 × k tables) and the Pearson's χ^2 test (>2 × 2 tables) were used to analyze the difference between groups of discrete data. The Cochran linear trend test (CLT) was used to analyze trends over time (2 × k tables). A multifactorial ANOVA was used to study the effect of 2 or more categorical variables on any continuous variable, since there is no good non-parametric multi factorial ANOVA equivalent. The continuous variables analyzed were the number of authors, institutions, countries, references, pages, normalized citations, and corresponding author position and how they were effected/dependent upon three categorical factors combined (author gender, decade, and region excluding the 9 manuscripts from Oceania). A p value less than 0.05 was considered statistically significant. Systat 10 software™ (Systat Software, Chicago, IL) was used to perform all statistical analyses.

5. RESULTS

A total of 402 publications met the inclusion criteria: 35 in1986, 58 in 1996, 155 in 2006, and 154 in 2016. The gender for 1.7% of first authors and 1.5% of corresponding authors could not be determined.

Analyses by Region

Overall, 68.2% (274) of the manuscripts originated from North America, 19.4% (78) from Europe, 10.2% (41) from Asia, and 2.2% (9) from Oceania (Fig. 1). No manuscripts were published from Africa or Latin America. Based on these initial findings, for the next series of analyses, Oceania, Africa, and Latin America were excluded due to few or no manuscripts (Africa and Latin America were excluded from all analyses).

The United States contributed 91.2% of the manuscripts from North America, while Canada contributed 9.8% of the manuscripts. Within Canada, 54.2% of the manuscripts originated from Ontario. Within the United States, California and New York combined together contributed 19.6% of the manuscripts. Among the European countries, the United Kingdom contributed 16.7% of manuscripts, followed by Italy (12.8%), and the Netherlands (11.5%). Among manuscripts originating from Asia, China and Israel equally contributed 24.4%, followed by Japan at 19.5%.

Trends Over Time and By Region

The average number of authors increased from 3.1 ± 1.7 in 1986 to 5.8 ± 2.6 in 2016 ($p < 10^{-6}$) (Fig. 2a); the corresponding author position increased from 1.6 ± 1.1 in 1986 to 3.8 ± 2.9 in 2016 ($p = 10^{-6}$) (Fig. 2a); the number institutions and countries per manuscript increased from 1.4 ± 0.7 in 1986 to 2.5 ± 1.5 in 2016 ($p < 10^{-6}$) and 1.1 ± 0.4 in 1986 to 1.5 ± 0.7 in 2016 ($p = 0.000008$), respectively (Fig. 2b). The number of printed pages per manuscript declined from 15.5 ± 4.4 in 1986 to 12.3 ± 2.3 in 2016 ($p < 10^{-6}$) (Fig. 2c). The average number of references per manuscript almost doubled from 21.7 ± 12.1 in 1986 to 42.2 ± 18.3 in 2016 ($p < 10^{-6}$) (Fig. 2d). Since the manuscripts published in 2016 were only one year old at the time of data collection, citation data was normalized by dividing the number citations by the number of years since publication. Using this method, the number of times each paper was cited increased from 0.6 ± 0.6 in 1986 to 3.2 ± 3.3 in 2016 ($p < 10^{-6}$) (Fig. 2e).

The number of authors varied by region ($p = 0.0012$) and was highest for Asia (5.4 ± 2.5), followed by Oceania (4.8 ± 2.9), Europe (5.0 ± 2.6), and North America (4.2 ± 2.3) (Fig. 3a). The average corresponding author position also varied by region ($p = 0.003$) and was highest for Asia (3.6 ± 2.8), followed by Oceania (3.1 ± 3.3), North America (2.9 ± 2.3), and Europe (2.4 ± 2.6) (Fig. 3a). The number of institutions collaborating on manuscripts varied by region of origin ($p = 0.009$). Manuscripts originating from Oceania had the highest number of collaborating institutions at 2.6 ± 1.5, followed by Europe and Asia both at 2.4 ± 1.5, and North America at 1.9 ± 1.2 (Fig. 3b). The number of collaborating countries also varied by region ($p = 0.0007$): Europe at 1.5 ± 0.7, Oceania at 1.4 ± 0.5, Asia at 1.4 ± 0.7, and North America at 1.2 ± 0.5 (Fig. 3b). The number of pages printed did not vary by

region ($p = 0.80$) (Fig. 3c) nor did the average number of references ($p = 0.77$) (Fig. 3d). There were differences by region for the normalized citation number (Europe at 3.6 ± 2.8, Oceania at 2.6 ± 1.7, North America at 2.4 ± 2.9, and Asia at 1.5 ± 1.2 ($p = 0.006$)) (Fig. 3e).

Gender Distribution of Authors Over Time by Region

The percentage of female first authors increased from 0% in 1986 to 28.6% in 2016 (CLT, $p = 0.003$) (Fig. 4a). Asia had highest percentage of female first authors (29.3%), followed by North America (22.8%), and Europe (20.0%) (Fig. 4b), although these differences were not significant ($p = 0.5$). The percentage of female corresponding authors rose from 0% in 1986 to 20.4% in 2016 (CLT, $p = 0.0009$) (Fig. 4c). Europe had the highest proportion of female corresponding authors (20.8%), followed by North America (18.4%), and Asia with the least (7.7%) (Fig. 4d), although these differences were not significant ($p = 0.20$).

Gender Combinations Between First and Corresponding Authors

We also studied gender combinations between the first and corresponding authors. The four different combinations were defined as MM (both male first and corresponding authors), MF (first author male and corresponding author female), FM (first author female and corresponding author male), and FF (both female first and corresponding authors). There were significant changes over time ($p = 0.00008$). The MM combination decreased from 100% in 1986 to 71.8% in 2016, while there was a significant increase in the other combinations. The MF combination increased from 0% in 1986 to 6.4% in 2016; FM combination from 0% in 1986 to 12.9% in 2016, and the FF combination from 0% in 1986 to 8.9% in 2016 (Fig. 5). The manuscript length was analyzed between these four groups, with no significant difference; the number of pages was 12.3 ± 4.1 for MM, 11.7 ± 2.6 for FM, 10.7 ± 2.2 for MF, and 11.6 ± 3.4 for FF ($p = 0.21$).

Effect of Gender/Region/Decade on Continuous Variables

When entering first author gender, decade, and region into the model, the decade had a significant effect on all of the continuous variables, and region had an effect on the number of authors, countries, normalized citations, and corresponding author position (Supplementary Table 1). First author gender had no effect on any of the continuous variables after controlling for decade and region. As seen with first author gender, when entering corresponding author gender, decade, and region into the model, the decade had a significant effect on all of the continuous variables and region had an effect on number of institutions, countries, normalized citations and corresponding author position. Corresponding author gender also had an effect on the number of institutions.

Comparisons between ABME® Editorial Board Members and Authors

The percentage of female *ABME*® Editorial Board members has steadily increased from 3% in 1986, 8% in 1996, 13% in 2006, and 28% in 2016 (Fig. 6a), along with the percentage of female first authors and corresponding authors. Regarding the region of Editorial Board members, in 1986 and 1996 all resided in North America. In 2006, 1 resided in Asia (3%), while the remainder resided in North America (97%). By 2016, 65% resided in North America, 19% in Europe, 9% in Asia, 5% in Oceania, and 2% in Africa.

Comparisons between BMES Presidents and Authors

During the 50 year history of BMES, 4 of the 46 presidents have been women. Starting in 2008, the BMES presidential term increased from 1 year to 2 years, changing the number of serving presidents per decade. The first female president was in 2001. The other 3 female presidents were in 2012, 2016, and 2018. The percentage of female BMES presidents in the 10 years proceeding the year in which manuscripts were analyzed, as well as the percentage of female first and corresponding authors over time, are shown in Fig. 6b. The percentage of women increased for all 3 groups over time, paralleling one another, with the presidential line the lowest. It should be noted that the two most recent presidents (2016 and 2018) are women, but are not reflected on the chart based on the years denoted.

6. DISCUSSION

In academia, scientific publications are a critical aspect of developing a career. At the same time, publications are used as a measurement of achievement and productivity.[2, 4, 27, 38] We performed a bibliometric analysis of many variables in *ABME*® over the last 30 years. We first studied the author gender to see if there has been an improvement in gender parity in *ABME*®. We focused on the gender of the first and corresponding author as typically the first author is identified as the individual who contributed the most to the work, including composing the manuscript, and is typically a junior colleague or mentee. Simultaneously, the corresponding author is traditionally accountable for the study design and the majority of the research is typically conducted in his or her laboratory or division. Although corresponding authors may not have performed the research, they are usually the ones guiding the study.[6, 7, 35, 39, 41, 45] Furthermore, corresponding authorship as well as co-authorship is essential for the advancement of the individual's academic career.[6, 7, 11, 19, 31, 39]

We found a significant increase in the percentage of female first and corresponding authors in *ABME*® over the last 30 years. The percentage of female first authors increased 28.6% since 1986, and female corresponding authors increased 20.4%. Similar 30 year bibliometric studies were performed recently in several orthopaedic surgery (which is traditionally a male dominated field)/bone biology journals (which have a higher female representation than orthopaedic surgery).[8, 17, 24, 32, 42, 43, 49] *ABME*® was tied with the Journal of Orthopaedic Research for the highest percentage point increase (rounded to nearest whole number) in manuscripts with female first authors over 30 years (Range: 1 to 30). Similarly, *ABME*® was second for the highest percentage point increase over 30 years in female corresponding author manuscripts published (Range: 0 to 27). Looking across many academic medicine journals, while the study design was not identical, the overall trends were similar for percentage increases over time (female first author Range: −4 to 33; female last author Range: 5 to 27).[5, 14, 16, 30, 36] Thus, gender authorship trends appear to be similar for *ABME*® as they are for other academic journals/fields.

One interesting observation is related to the differences between female first and corresponding author percentages. This is perhaps one of the most interesting findings as the percentage of females in the first author position in *ABME*® manuscripts (28.6%) narrowly exceeds the percentage of females in the corresponding author position (20.4%) in 2016. This 8.2% difference is encouraging and suggests that the gender gap is closing. Similar

trends are also seen in other academic journals.[5, 14, 16, 30, 36] It is possible that the lower percentage of female corresponding authors could be attributed to the fact that women occupy fewer upper level positions in academia,[25] even when the percentage of females pursuing undergraduate and Ph.D. programs have been steadily increasing.[26] As the percentage of both female first and corresponding authors increased over the past 30 years, and have almost equalized, it is hopeful such trends will continue in the future.

In academia, the educational benefits of diversity and inclusivity are concrete and significant.[4, 10] Recent studies have demonstrated that all forms of diversity (gender, ethnic, disciplinary, and academic) are important for both moral and ethical reasons as well as financial.[40] Indeed, it has been demonstrated that diversity improves financial gains and increases productivity in business.[29] In science, manuscripts with diverse authorship have increased citations.[1, 20] Thus, there are unique opportunities in the field of BME due to its wide appeal to women, underrepresented minorities, and people with disabilities.[10] Although gender is one aspect of diversity, there are many others, including racial and ethnic diversity. While we were unable to identify the racial or ethnic background of the authors, the region of origin was used as one proxy for these measures. We noted several significant differences by region. The total number of authors, corresponding author position, number of collaborating institutions, number of collaborating countries, and number of normalized citations all varied significantly by manuscript region of origin. Asia had the highest percentage increase of female first authors since 1986 (43.5%), followed by North America (26.7%) and Europe (17.2%). For corresponding authors, North America had the highest increase since 1986 (21.1%), followed by Europe (19.4%), and Asia (9.5%). Hopefully these numbers will increase in the future since the percentage of women pursing a Ph.D. in BME is increasing.[26]

As with any study, there are limitations. As noted above, we were unable to specifically assess author ethnicity. Additionally, the accuracy of our gender based analysis depends on the accuracy of the website for gender ratio scores greater than 3.0. However, this website/technique was previously validated.[36] We also only analyzed one year per decade. While we recognize that fluxes (e.g. economic) within a decade could in theory impact the data, we believe this will not be the case in practice for two main reasons. First, the decade method compared to a 10% random sampling of all manuscripts from each year has been previously validated in the *Journal of Bone and Mineral Research*.[49] There were no significant differences based on the method used. We are thus confident that the decade approach is reliable for these types of bibliometric studies. Second, the life for any one manuscript from inception of the study to final publication is markedly different for many reasons, including the need for grant funding or not, study complexity, writing, time to editorial decision, time for revision, variability in acceptance rates among journals, and even variability in time from acceptance to publication. Thus, economic fluxes for one year would likely be mitigated/neutralized by these other factors, as some studies may have begun 5–10 years before publication, while for others the time span from inception to publication may only be one year or less.

Over the last 30 years, *ABME*® has shown an increase in the number of manuscripts published, and for the manuscripts themselves, there has been an increase in the number of

authors, corresponding author position, number of collaborating institutions and countries, references cited, and citations received. As the Biomedical Engineering Society (BMES) is the society associated with the *ABME*®, we wished to compare the member region of residence and member gender composition of the society to the first and corresponding author gender composition and manuscript origin.

Regarding geographic region, 68.2% of all *ABME*® manuscripts originated from North America. Of note, although BMES is an international organization, as of June 2018 approximately 95.8% of all BMES members reside in the United States (North America region). Thus, the marked increase observed in female first authors residing outside of the United States, and in particular in Asia (29.3%), cannot be due to a change in BMES membership composition. Although not conclusive, the following data may lend insight as to the striking increase in female first author manuscripts originating from Asia in *ABME*®. As detailed in the National Science Foundation 2015 Doctorate Recipients from U.S. Universities,[37] female U.S. citizens and permanent residents have earned more than 50% of doctorate degrees since 2002. During this same period, more than 1/3 of temporary visa holders earning doctorates were women. Of note, approximately 36% of the science and engineering doctorates were awarded to temporary visa holders since 2007. From 2005–2015 ten countries accounted for 71% of the doctorates awarded to temporary visa holders (in order: China, India, South Korea, Taiwan, Canada, Turkey, Thailand, Iran, Japan, and Mexico), with 7 of 10 being located within Asia. Additionally, the largest growth in the number of female doctorate recipients between 2005 and 2015 was in engineering with bioengineering and BME taking the lead. Taken together, these data describe a large number of U.S. doctorate degrees being awarded in BME to females from Asia. Another study shows that Chinese students completing doctoral studies in the U.S. have on average 25–30% higher scientific output than other students.[22, 29] In addition to changes in Asia, *ABME*® female first authors markedly increased over time from North America (22.8%) and Europe (20.0%).

Regarding gender, in June 2018, within the BMES membership data, there were 3 main categories of members which are likely contributing to the bibliometric data in this study. The “student” and “early career” members likely serve as first author, while the “members” likely serve as corresponding authors. Interestingly, a large percentage of members did not specify a gender (16.5%, 10.9%, and 8.0% for BMES members in the respective categories: student, early career, and member). In 2018, 37% of BMES members self-identified as female. This is somewhat higher that the percentage of female first authors (28.6%) and female corresponding authors (20.4%) in 2016. These statistics are encouraging for the future, as currently 40.8% of BMES student members and 37.0% of early career members self-identified as females, and generally speaking one usually serves as a first author before serving as a corresponding author. We thus believe that the *Annals of Biomedical Engineering* has, and will continue to serve, its readership by improving gender parity within the field.

In summary, although our study does not conclusively prove cause and effect, several important correlative trends have been identified which may provide BMES, *ABME*®, and the BME field with insights for further closing gender-based gaps (which may also be

relevant for generalized diversity). First, increasing representation of women (and investigators from diverse backgrounds/regions) in the field is critical (recruitment and retention). Second, increasing representation of women (and investigators from diverse backgrounds/regions) on Editorial boards and in leadership positions (such as president of BMES) appears to improve parity.[18] It has been shown that editors (and teams of reviewers) are more likely to accept papers from authors with the same gender whom are from their same country.[46] There has been a striking increase in the diversity of the Editorial Board members from 2006 to 2016. When Dr. Kyriacos Athanasiou became Editor-in-Chief in 2010, he made a strategic decision to significantly modify the Editorial Board composition.[3] Indeed, he wrote, "We also have an opportunity to expand our diversity by increasing the number of submissions from different scientific areas and from constituents around the world. We have already begun to diversify our Board of Associate Editors by inviting leading scholars from Europe, Asia, Australia, the Middle East, and Africa (please see the journal's masthead)." While it is unclear whether the Board was specifically charged with increasing parity, and if these actions could be deemed as causal, we did at least observe a corresponding increase in manuscript acceptances in terms of overall diversity (both geographic and gender) during this same time period. Although not currently a policy of *ABME*®, many journals have adopted the double-blind review approach to further reduce bias and increase author diversity.[21] Many studies have shown that unconscious bias exists with respect to gender, race, and country of origin,[9, 13, 21, 33] although others have not.[12, 48] Although some argue against double-blind reviews due to the burden for concealing the identity of authors and difficulty in identifying conflicts of interest, the likely advantages of levelling the playing field, decreasing bias, and providing all scientists with the opportunity to have their work judged by its scientific merit, may outweigh the disadvantages. Taken together, these concrete steps have and will continue to improve parity in BMES, *ABME*®, and the field of BME.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

7. ACKNOWLEDGMENTS

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Abbreviation

ABME	Annals of Biomedical Engineering
BME	Biomedical Engineering
BMES	Biomedical Engineering Society
B.S.	Bachelor of Science
CLT	Cochran linear trend test

M.S.	Master of Science
Ph.D.	Doctor of Philosophy

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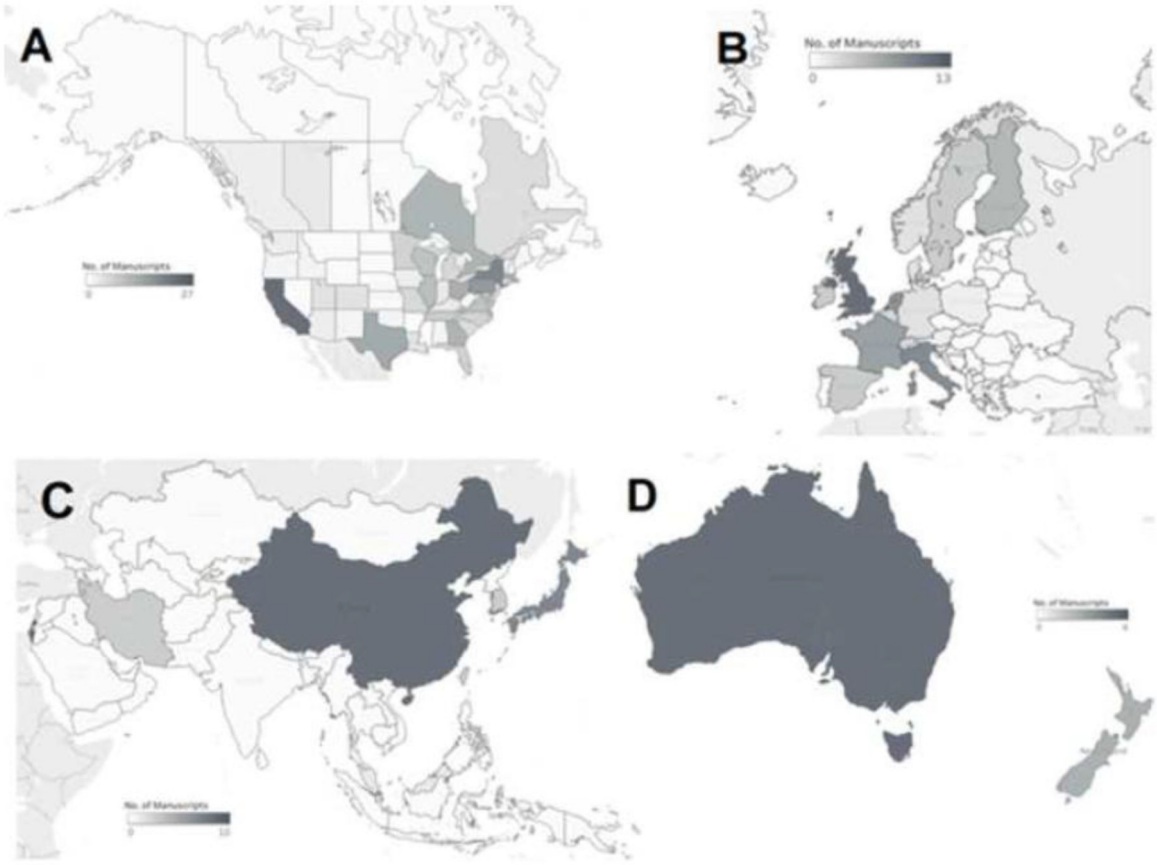

FIGURE 1.

Maps showing the countries and states/provinces from which publications originated: A) North America; B) Europe; C) Asia; and D) Oceania. Black represents the highest percentage of manuscripts while white indicates no manuscripts were published in the country or state/province.

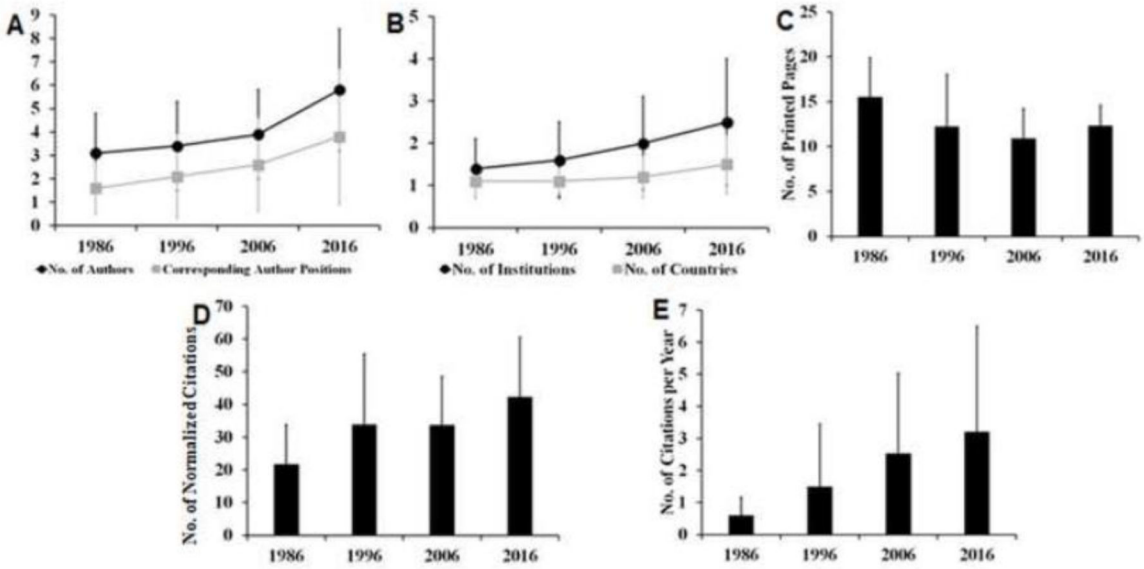

FIGURE 2.

Bibliometric trends over time. A) Number of authors and corresponding author position. B) Number of countries from which authors on manuscripts reside and the number of institutions collaborating on published manuscripts. C) Number of pages in the published manuscripts. D) Number of references cited within each manuscript. E) Number of times each published manuscript was cited in other manuscripts (normalized by the age of the manuscript). The data are the mean ± 1 standard deviation.

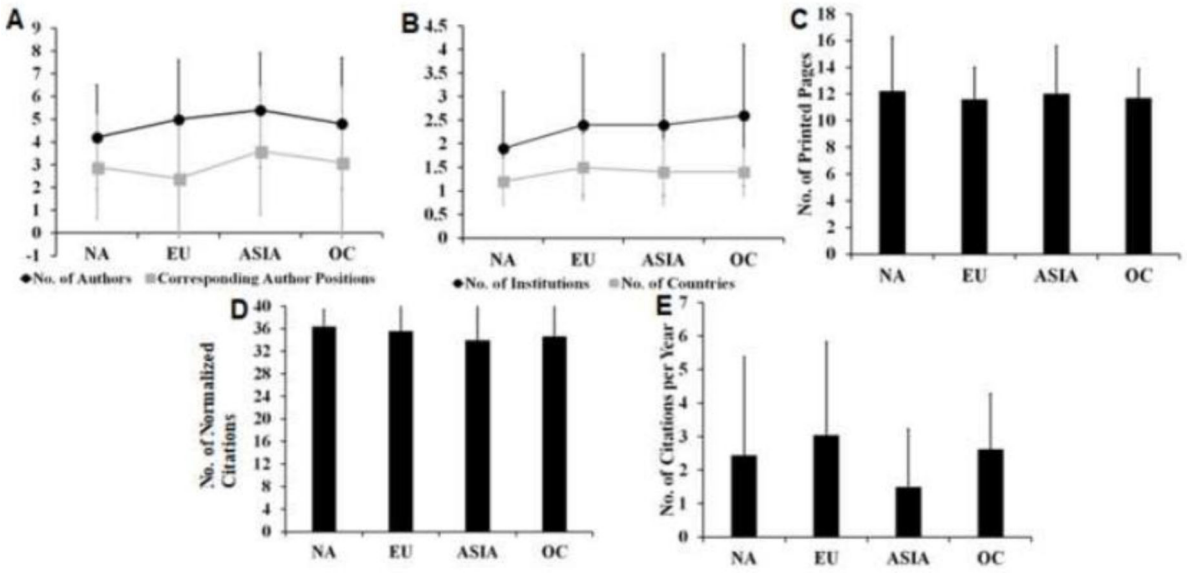

FIGURE 3.

Trends by region. A) Number of authors and corresponding author position. B) Number of countries from which authors on manuscripts reside and the number of institutions collaborating on published manuscripts. C) Number of pages in the published manuscripts. D) Number of references cited within each manuscript. E) Number of times each published manuscript was cited in other manuscripts (normalized by the age of the manuscript). The data are the mean ± 1 standard deviation. North America = NA, EU = Europe, OC = Oceania.

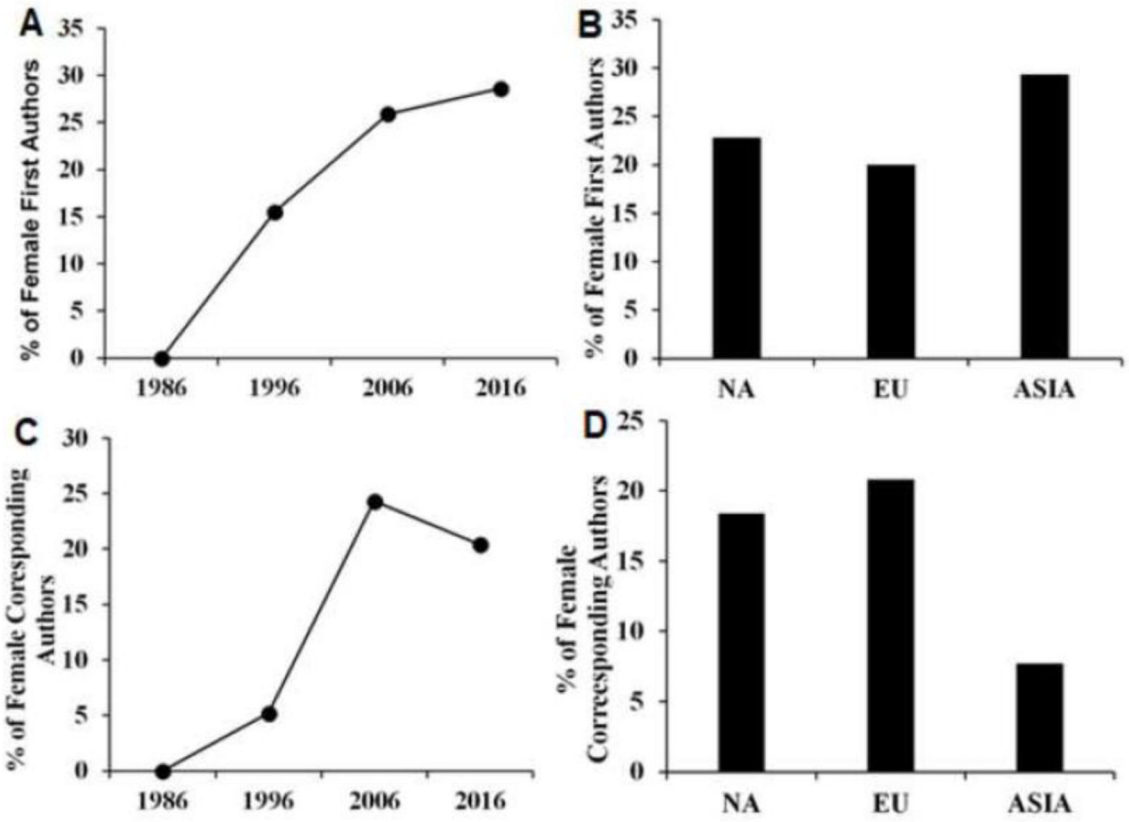

FIGURE 4.

Percentage of female first and corresponding authors by time and region. A) Gender distribution of first authors over time. B) Gender distribution of first authors by region. C) Gender distribution of corresponding authors over time. D) Gender distribution of corresponding authors by region.

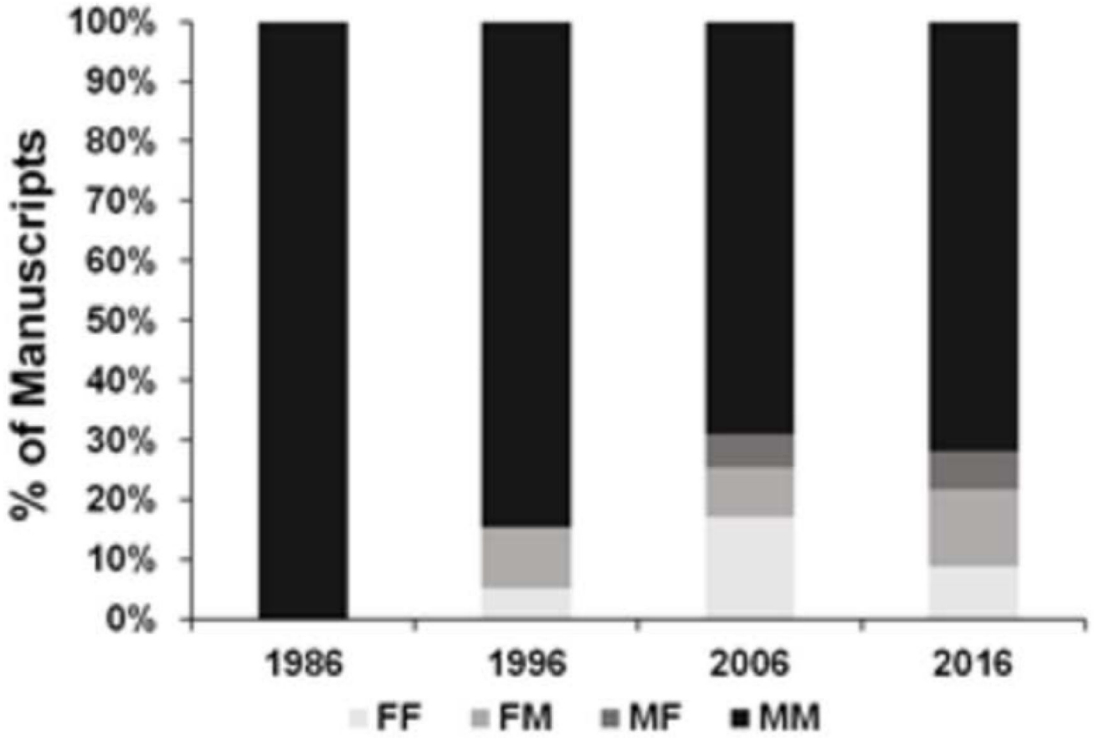

FIGURE 5.

Gender combinations between first and corresponding authors over time. MM = both first and corresponding authors are male, MF = first author is male and corresponding author is female, FM= first author is female and corresponding author is male, and FF = both first and corresponding authors are female.

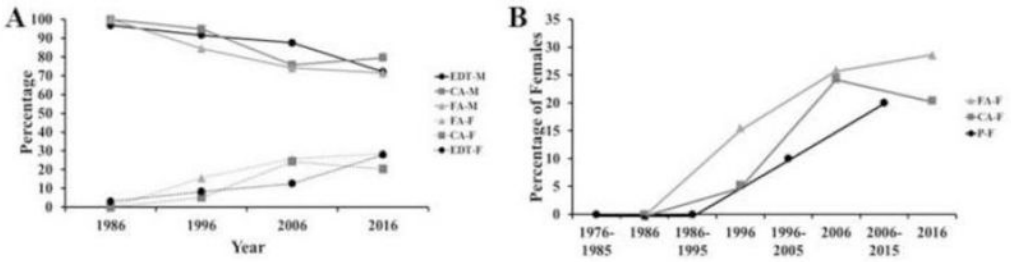

FIGURE 6.

A) Changes in gender composition over time for first and corresponding authors and Editorial Board members. B) Percentage of females serving as ORS president, first author, or corresponding author over time. FA denotes first author, CA denotes corresponding author, EDT denotes Editorial Board, P denotes president, F denotes female, and M denotes male.